



## Memorandum

To: Stephanie Vaughn (USEPA)  
Elizabeth Franklin (USACE)

From: Keegan Roberts, PhD, PE (CDM Smith)  
Scott Kirchner (CDM Smith)

Date: April 28, 2015

Re: Summary of Field Oversight: LPR River Mile 10.9 Initial SPME Reconnaissance  
(April 20 to 21, 2015)  
Lower Passaic River Restoration Project

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the River Mile 10.9 site on April 19<sup>th</sup>, 2015 and provided oversight of the April 20<sup>th</sup> and 21<sup>st</sup>, 2015 Cooperating Parties Group (CPG) remedial investigation/feasibility study (RI/FS) field activities. These field activities are in preparation of a baseline cap performance monitoring event of the River Mile 10.9 sediment cap. This performance monitoring event will use solid-phase microextraction (SPME) passive porewater samplers to assess contaminant concentrations in the sediment bed, in the active cap layer, and in the armor stone layer.

CDM Smith oversaw the following activities:

1. Probing to evaluate the thickness of the individual cap layers (habitat, armor, and active). This information will assist in refining the sample depths for the SPME samplers.
2. Attempts to install the SPME samplers using two alternative installation techniques: AMS Soil Vapor probe and Henry Push Point Sampler.
3. Attempts to access each proposed upcoming sampling location to evaluate if the samplers may be installed in the dry at low tide or if divers will be needed to install the samplers.

All activities were conducted in accordance with the CPG's *Field Activity Work Plan, LPR River Mile 10.9 Initial Reconnaissance, April 20, 2015*.

Photographs of field activities are located in Attachment 1. Copies of logbook notes are provided in Attachment 2.

### Personnel in Attendance

#### **April 20, 2015**

Keegan Roberts - CDM Smith  
Bill Potter – de maximis, inc.  
John Rolfe - de maximis, inc.  
Ryan McCarthy - AECOM  
Micheal Spera - AECOM

Kaitlin Sylvester – AECOM

**April 21, 2015**

Keegan Roberts - CDM Smith

John Rolfe - de maximis, inc.

Ryan McCarthy - AECOM

Kaitlin Sylvester – AECOM

**General Summary**

Oversight consisted of observing field activities related to the three tasks identified above. Field activities were conducted by CPG subcontractor AECOM and CPG oversight was provided by de maximis, inc. (DMI). Keegan Roberts of CDM Smith provided oversight for EPA.

All reconnaissance work was conducted by land; no vessels were deployed for this field effort. The CPG field crew attempted to reach each of the ten proposed sampling locations “in the dry” (i.e., by walking from shore over the cap during a period of low tide). However, possibly due in part to a several hour duration rain event, the water level during field activities was above 9 of the 10 proposed sampling locations (only location 5 was exposed during low tide; Photo 1). Based on GPS coordinates and conversations with AECOM personnel, the majority of the proposed sample locations were located at least 5 meters further towards the river’s center beyond the low tide water line. Based on these observations, it is likely that any passive porewater installation at the River Mile 10.9 sediment cap will require the use of either boats or divers. J. Rolfe of DMI noted that during high tide the proposed sample locations would have approximately 5-10 feet of water above them.

As the majority of the proposed sample locations could not be reached in the dry during the field activities, the thickness of the existing cap layers at these locations could not be determined. However, areas that were exposed during the low tide were probed to determine the layer thickness at those locations. In general, the sand and/or silt layer overlaying the armor stone was approximately 6 to 12 inches thick. It is unknown at this time whether this layer was composed of the original sand habitat layer, deposited silt from the river, or some combination of the two. A surficial sediment sample (top six inches) was not collected from the habitat layer during the field effort, as was indicated by the workplan, for unknown reasons. This habitat/silt layer thickness was assessed by pushing a marked probing rod (see Photo 2) through the top of the exposed sand/silt surface until refusal was encountered at the top of the armor layer.

The probe used to gauge the thickness of the sand layer was unable to penetrate the top of the armor layer underlying the surficial sand and silt at each location. As a result, an AMS soil vapor probe with a pointed tip (see Photo 3) was used to attempt to penetrate the armor layer and the geotextile underlying the armor layer. However, penetration could not be achieved by simply pushing the probe downward. A slide hammer was necessary to drive the point through the armor layer and the geotextile underlying the armor layer (Photos 4, 5, and 6). The armor layer thickness overlying the geotextile was then estimated to be the distance between a.) where the probe rod originally encountered refusal and b.) where the slide hammer-driven point encountered significantly less resistance during insertion (the thought process being that once the armor layer and geotextile was penetrated, the underlying active layer would offer significantly less resistance to penetration). Based on field observations of the locations that were probed, the thickness of the armor layer was approximately 12 inches, with minor variations of a few inches thickness at the various locations.

The thickness of the active layer underlying the armor layer could not be assessed using a core tube due to the thickness of the armor stone layer and the inability of the core tube to penetrate the armor layer. An attempt was made to remove armor stone with a shovel; however, the armor stone could not be easily removed in this manner (Photo 7). Techniques to assess or estimate the active layer thickness will have to be developed before the field mobilization for the baseline monitoring event.

AECOM attempted to advance a Henry Push Point sampler (Photo 8) through a portion of exposed geotextile near the riverbank. The Henry sampler was unable to penetrate the geotextile without significant “bowing” of the sampler. Based on this observation, it is unlikely that the Henry sampler would be able to penetrate both the armor stone layer and the geotextile without significant physical deformation of the sampler. The armor stone layer at the proposed sampling locations would likely have to be removed if Henry samplers were selected for use.

The AMS Soil Vapor probe, driven by a slide hammer, was able to penetrate through the armor stone and into the active cap layer. AECOM suggested that the soil vapor probe could be driven through the armor stone to the desired depth, the sample screen at the probe tip could be exposed, and a SPME sampler could be inserted through the top of the hollow stem of the sampler down to the exposed screen interval (Photos 9 and 10 present two types of AMS soil vapor probe screens). This sampler arrangement would remain in place until the conclusion of the sampler deployment period. If this approach were taken, measures preventing surface water or precipitation from entering the top of the hollow stem would be required in order to prevent these waters from potentially diluting the porewater entering the sampler through the screen. SPME fibers were not placed into the soil vapor probe prior to it being driven through the armor layer as the exact SPME fiber deployment technique is not yet known.

During the visual inspection of the proposed sampling sites, armor stone of an apparent increased size and thickness (as compared to the few exposed armor stones at other cap locations) was visible near the northern most portion of the cap (Photo 11). This area was not accessible by foot. This armor stone was apparently placed to avoid erosion of the cap from an outfall at that location. Penetration of the armor stone layer at this location may be difficult, even with the slide hammer-driven probe. An alternate sampling location having similar physical and chemical characteristics as this location should be selected as a contingency.

In summary, the following observations and considerations should be addressed before field mobilization for the baseline monitoring event:

- Access to the sample locations will likely require vessels or divers
- Techniques to assess or estimate the active layer thickness will have to be developed
- Armor stone will likely have to be removed at sampling locations if Henry samplers are used
- If soil vapor probes are used for SPME deployment, three separate samplers may have to be deployed in order to assess the three separate depth intervals identified for this investigation
- If soil vapor probes are used for SPME deployment, steps to prevent surface water dilution of the porewater entering the screened interval will have to be taken
- Alternate sample locations should be prepared in case the current proposed locations cannot be sampled. These alternate locations should exhibit similar physical and chemical characteristics as the original proposed locations.

**Attachment 1**  
**Photographs of Field Activities**



**Photo 1 - Accessing Proposed Location 5  
(4/21/2015)**

Probing rod for gauging thickness of habitat  
layer/silt overlying armor layer



**Photo 2 - Probing Rod and GPS'ing of Location  
(4/20/2015)**



**Photo 3 - AMS Soil Vapor Probe Before (bottom) and After (top)  
Penetration of Armor Layer  
(4/20/2015)**



**Photo 4 - Slide Hammer used for Inserting AMS Soil Vapor Probe  
through Armor Layer  
(4/20/2015)**



**Photo 5 - Inserting AMS Soil Vapor Probe through Armor Layer  
(4/20/2015)**



**Photo 6 - Inserting AMS Soil Vapor Probe through Armor Layer  
(4/20/2015)**



**Photo 7 – Attempt to Remove Armor Layer with Shovel  
(4/20/2015)**



**Photo 8 – Henry Push Point Sampler  
(4/20/2015)**



**Photo 9 – Screen on AMS Soil Vapor Probe  
(4/20/2015)**



**Photo 10 – Screen on AMS Soil Vapor Probe  
(4/20/2015)**



**Photo 11 – Armor Stone at Northern Portion of Cap Near Outfall  
(4/21/2015)**

**Attachment 2**  
**Logbook Notes**

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Location E. RUTHERFORD, NJ Date 4/20/15Project / Client LPR RM 10.9 SPME FIELD TREATClient: USEPA Notes by: K. ROBERTS

1215 ARRIVE AT SITE; HEAVY RAIN; DELAY  
START OF PROBING  
PERSONNEL:

K. ROBERTS - CDMA SMTS  
BILL POTTER - DEMATELUS  
JOHN ROUSE - DEMATELUS  
KATELYN SYLVESTER - AECOM  
RYAN MCCARTHY - AECOM  
MIKE SPERA - AECOM

1430 AECOM TO ATTEMPT TO FIND  
SUITABLE TEST LOCATION.  
RIVER LEVEL STILL AT  
HIGH WATER MARK. STILL  
RAINING.

1450 NO PROPOSED SAMPLING  
LOCATIONS AVAILABLE FOR  
TESTING WITH HIGH WATER  
FLOW

1513 DEMATELUS & AECOM LEAVE  
SITE FOR LUNCH. K. ROBERTS  
STAYED ON-SITE.

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Location E. RUTHERFORD, NJ Date 4/20/15Project / Client LPR RM 10.9 SPME FIELD TREATClient: USEPA Notes by: K. ROBERTS

1547 DEMATELUS RETURNS TO  
SITE

1610 AECOM (SYLVESTER/MCCARTHY)  
ARRIVE BACK AT SITE. SPERA  
REMAINED AT SITE.

1611 RAIN IS MINIMAL. RIVER  
LEVEL DROPPING. WATER  
LEVEL STILL NOT LOW ENOUGH  
TO INSTALL SAMPLERS BY  
WADING.

1632 SET-UP TO ATTEMPT SAMPLER @  
LOCATION 15A - Ø603.

1646 WATERLINE STILL 60 FT FROM  
SAMPLER LOCATION 15A - Ø603

1652 DIFFICULTY DRIVING PROBE  
THROUGH FIRST SIX INCHES.  
REFUSAL. PROBING IS NOT AT  
PROPOSED SAMPLING LOCATION  
DUE TO WATER LEVEL.

Location E. RUTHERFORD, NJ Date 4/20/15  
 Project / Client LPR RM10.9 SPME FIELD TRIAL  
 CLIENT: USEPA NOTES BY: K. ROBERTS

1656 PROBE CANNOT PENETRATE THROUGH GEOTEXTILE. ATTEMPT TO PENETRATE PIECE OF EXPOSED SURPLUS GEOTEXTILE NOT OVER CAP USING DRIVE POINT AND SLIDE HAMMER. DRIVE POINT AND SLIDE HAMMER CAN PENETRATE GEOTEXTILE.

1700 ATTEMPT TO CLEAR ARMOR STONE USING SHOVEL. ARMOR STONE NOT EASY TO CLEAR WITH SHOVEL.

1702 ABLE TO PENETRATE 18" BGS WITH DRIVE POINT AND SLIDE HAMMER. STOP TEST TO RETRIEVE DRIVE POINT. (COULD HAVE BEEN DRIVEN DEEPER FAIRLY EASILY (PER MCCARTHY))

1705 MOVE TO SECOND TEST LOCATION. SAME RESULTS AS FIRST LOCATION. ABLE TO PENETRATE THROUGH ARMOR LAYER AND GEOTEXTILE. APPROXIMATE PENETRATION OF 30-40" BGS.

Location E. RUTHERFORD, NJ Date 4/20/15 123

Project / Client LPR RM10.9 SPME FIELD TRIAL  
 CLIENT: USEPA NOTES BY: K. ROBERTS

1706 J. ROLFE NOTED FIRST TWO LOCATIONS HAVE SMALLER ARMOR STONE THAN OTHER PORTIONS OF CAP.

1714 MOVE TO LOCATION 3. SAMPLER APPEARS TO HAVE PENETRATED BEGGER ARMOR STONE.

1730 MOVE TO NEXT LOCATION. SAMPLER APPEARS TO HAVE APROX. THE SAME PENETRATION.

1738 AECOM PERFORMS DEMO. ENCOUNTERED REFUSAL FOR FIRST TIME. MOVE OVER 1 FT. ACTIVE PENETRATION. ~~OK~~ <sup>WR</sup> 4/20/15  
 MAY HAVE TO DO 3 POINTS AT EACH SAMPLE LOCATION TO GET AT 3 INTERVALS, NOTE: HOW TO TELL WHEN IN SEDIMENT BED?

Location E. RUTHERFORD, NJ Date 4/20/15Project / Client LPR RM 10.9 SPME FIELD TRIALClient: USEPA Notes by: K. ROBERTS

1749 ATTEMPT HENRY SAMPLER  
DEPLOYMENT. DIFFICULT TO  
PENETRATE JUST GEOTEXTILE.  
DIFFICULT TO MAINTAIN INTEGRITY  
OF SPME.

NOTE: ID OF "WELL CASING" WOULD  
BE 0.25", 5 1/2" SCREEN  
INTERVAL (2" SCREEN IS  
POSSIBLE)

NOTE: HOW TO STOP WATER FROM  
COMING INTO TOP OF TUBE AND  
BASICALLY SAMPLING SURFACE  
WATER/DILUTED POREWATER.

1809 EXIT RIVER, DECON ACCORDING  
TO WORKPLAN.

1820 LEAVE SITE.

END OF DAY

*K. Roberts*  
4/20/2015

Location E. RUTHERFORD, NJ Date 4/21/15 125Project / Client LPR RM 10.9 SPME FIELD TRIALClient: USEPA Notes by: K. ROBERTS

0600 ARRIVE AT SITE AWAITING  
SUFFICIENT DAYLIGHT TO  
START WORK.

PERSONNEL:

K. ROBERTS - CDM SMITH

KATELYN SILVESTER - AECOM

RYAN MCCARTHY - AECOM

0627 MORE OF MUDFLAT EXPOSED  
THAN YESTERDAY EVENING.  
AECOM INSPECTS GPS'S  
LOCATIONS TO DETERMINE  
IF THEY CAN BE REACHED BY  
WADING. PROPOSED SAMPLING  
LOCATIONS ARE STILL NOT  
ACCESSIBLE VIA WADING ("ON  
FOOT AND NOT IN WATER")

0636 MOST LOCATIONS > 5m BEYOND  
WATERLINE. HABITAT LAYER  
ABOUT 6" THICK ABOVE ARMOR  
LAYER (PER MCCARTHY) IN SOME  
PLACES 12" IN OTHERS.

Location E. RUTHERFORD, NJ Date 4/21/15  
 Project / Client LPR RM10.9 SPME FIELD TREAT  
 CLIENT: USEPA NOTES BY: K. ROBERTS

0642 J. RUFFE (DE MAXIMUS) ARRIVES AT SITE.

0645 AECOM ABLE TO WADE TO POINT 5. ONLY POINT ACCESSIBLE SO FAR. APPROX 1 FT 4 IN OF SAND COVER AT THIS LOCATION.

0652 AT LOCATION 6, ~~STILL~~ 4/21/15 WATERLINE STILL 10-15 M FROM ACTUAL LOCATION. AT HIGH TIDE, SAMPLE LOCATIONS WOULD HAVE APPROX. 5-10 FT OF WATER ABOVE THEM (PER J. RUFFE)

0658 AT LOCATION 7, 6-12" OF SAND MATERIAL; LOCATION 15 M FROM WATER LINE.

10702 AT LOCATION 8, APPROX. 6" OF SAND. LOCATION 5 M OUT FROM WATERLINE.

Location E. RUTHERFORD, NJ Date 4/21/15 127  
 Project / Client LPR RM10.9 SPME FIELD TREAT  
 CLIENT: USEPA NOTES BY: K. ROBERTS

0705 LIMITED WALKING ACCESS TO SHORE AT LOCATION 9 (FENCING, BULLHEAD, OUTFALL)

0708 LOCATION 10 HAS LARGE EXPOSED ARMOR STONE NEAR OUTFALL.

0720 TRY PROBING AT LOCATION 5. 12" ARMOR. ABLE TO PENETRATE CAP. TOP 4" SOFT. THEN 12" ARMOR (PER McLAUGHLIN)

0740 AECOM DECONS ACCORDING TO WORKPLAN

0800 LEAVE SITE

END OF DAY

*K. Roberts*  
 4/21/2015